12.5. The supernova SN1987A was at a distance of about 51.47 kPc from us and had about 10^{46} J total energy release as estimated from the neutrino flux hitting Earth. How much mass in kg was then converted to energy in the explosion?

Use the equation Q=931.5*ΔM, but remember to convert J to MeV and then u to kg.

$MeV := 10^{6} \cdot \left(1.60217733 \cdot 10^{-19} \cdot joule\right)$ $MeV = 1.602 \cdot 10^{-13} \cdot joule$

$Q := 10^{46} \cdot joule$ $QMeV := \frac{Q}{MeV}$ $QMeV = 6.242 \cdot 10^{58}$

$\Delta Mu := \frac{QMeV}{931.5}$ $\Delta Mu = 6.7 \cdot 10^{55}$

$u := 1.6605402 \cdot 10^{-27} \cdot kg$ $\Delta Mkg := \Delta Mu \cdot u$ $\Delta Mkg = 1.113 \cdot 10^{29} \cdot kg$

1 solar mass = $1.99 \cdot 10^{30} \cdot kg$ Hence about 0.06 of a solar mass was consumed in the explosion.